Barriers and Other Facilities in the Development of Alternatives

July 15, 2005

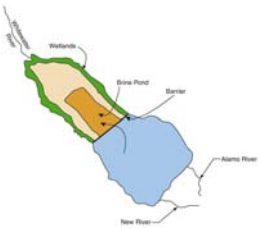
Alternatives Development

- **Iterative design and evaluation process to meet habitat, infrastructure, water quality, and air quality objectives**
- **Assumptions for habitat based on current knowledge and objectives – will revise as specific habitats are developed by working group**
- **Refinements to treatment of emissive soils and sizing of brine pool developed through modeling of specific configurations**
- **Developing a range of alternatives to evaluate effectiveness in meeting objectives under a range of inflows**

Potential Alternatives

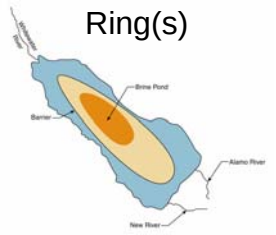
North Sea

South Sea



Combined

Concentric Ring(s)



Connection to Gulf

Evolving Sea

Workgroup Progress

- **First workgroup meeting held on July 6**
- **Discussed barrier alternative layouts and water use assumptions**
  - South Sea, North Sea, and Combined
- **Next meeting on August 8**
  - To discuss other alternatives under consideration

Workgroup Objectives

- **To obtain input on range of alternatives under consideration**
  - Distribute available water of sufficient water quality and quantity to various areas within the sea
  - Discuss tradeoffs
- **To understand operational and facility requirements of each alternative**
- **To understand sensitivity of each alternative to long term inflows and variability**
- **To develop criteria for construction related impacts and project phasing**

Proposed Features to Reduce Environmental Problems at Salton Sea

- **Integrate Habitat**
  - Open Sea Habitat
  - Fresh Water Habitat
  - Salt Water Marsh Habitat
- **Partition Sea**
  - Stabilize Salinity (w/ brine dump)
  - Stabilize Sea Elevation
- **Water Treatment to Meet Habitat Requirements**
  - Nutrients cause eutrophication
  - Reduce Eco-Risk due to Selenium
- **Air Quality Management**
  - Future exposed soils reduce air quality

Examples: Development of Three Basic Alternative Configurations

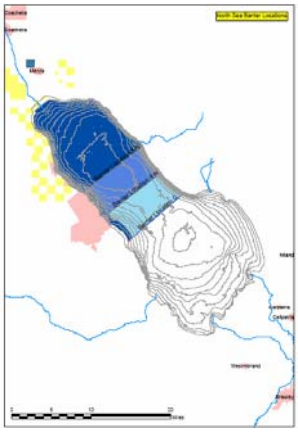
Assumptions for Examples Described in this Presentation

- **Freshwater wetlands: Up to 39,000 Acres**
  - Includes possible allocation for wetlands water treatment
- **Shallow salt water habitat: Up to 17,000 acres**
  - Included in all alternatives with barriers where marine water must be conveyed to brine for salinity balance
- **Open sea habitat: Up to 120,000 acres**
  - Dependant on barrier location
- **Air Quality Management: Up to 110,000 acres**
  - Dependant on barrier location and inflow assumptions

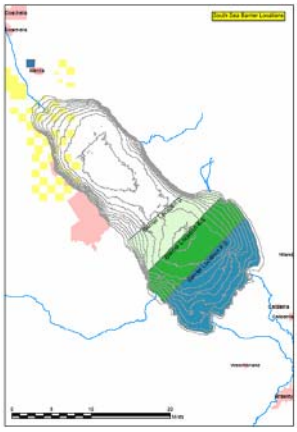
Assumed Inflows and Open Sea Objectives for Examples Described in this Presentation

- **Inflow for Three Steady-State Conditions**
  - 1,000,000 acre-feet/year
  - 850,000 acre-feet/year
  - 650,000 acre-feet/year
- **Open Sea Elevation: 235 feet Below Mean Sea Level**
- **Open Sea Salinity: 30,000 to 40,000 mg/L**

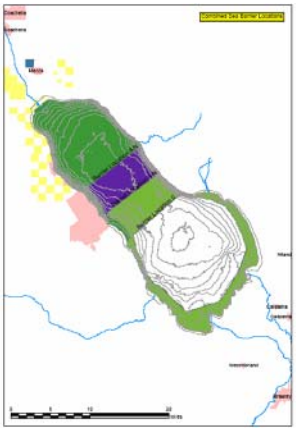
General Barrier Locations Described in this Presentation



North Sea



South Sea

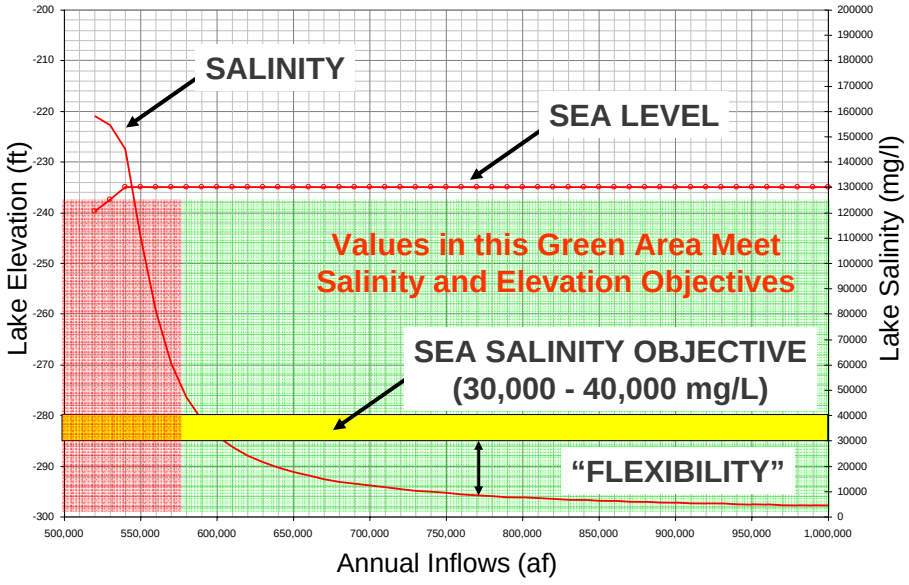


North Sea - Combined

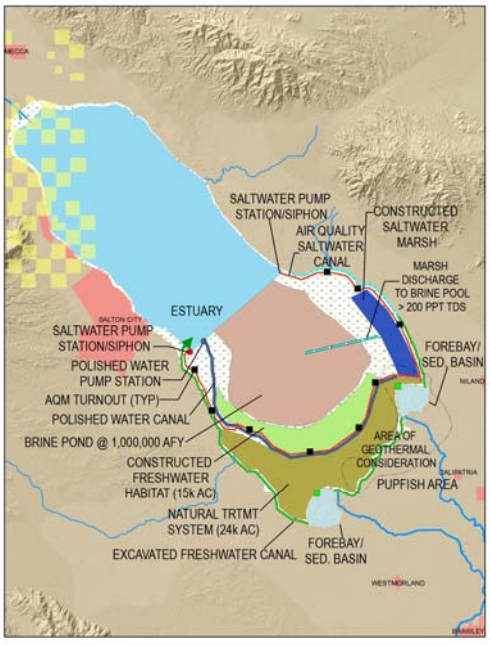
This Presentation describes Sensitivity of Several Variables

- **Changes that can occur by adding up to 39,000 acres of Fresh Water Marsh or Fresh Water Natural Treatment Marsh**
- **Changes that can occur by moving barrier location**

Example of Sensitivity Analysis Results



North Sea Alternatives

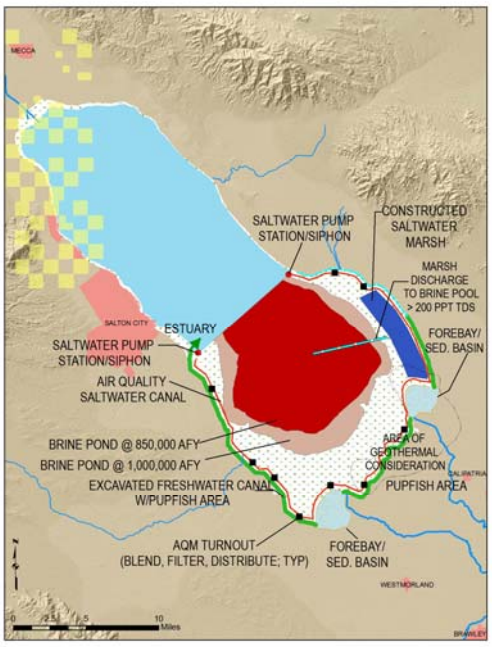


NORTH SEA ALTERNATIVE CONCEPT EXAMPLE

MID-SEA BARRIER:
Shortest Distance across Salton Sea

FRESHWATER MARSH:
Up to 39,000 Acres (including Natural Treatment systems)

SALT WATER MARSH:
Up to 6,000 Acres



NORTH SEA ALTERNATIVE CONCEPT EXAMPLE

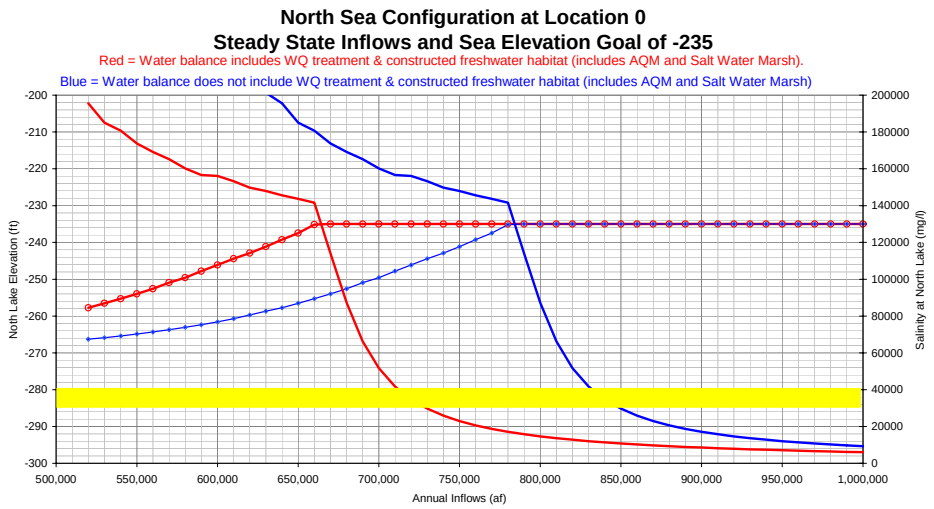
MID-SEA BARRIER:
Shortest Distance across Salton Sea

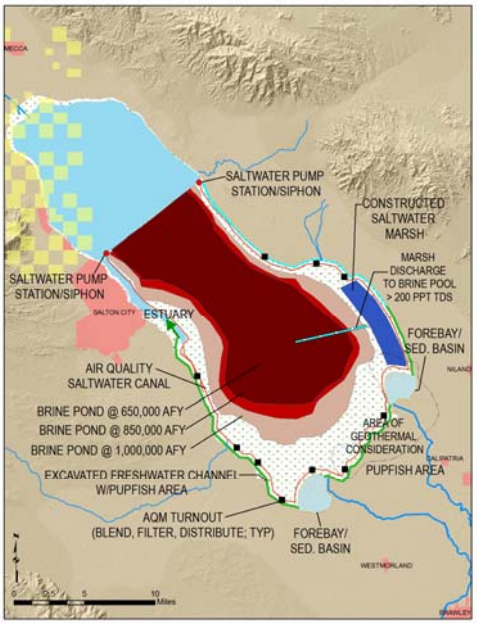
FRESHWATER MARSH:
None in this example

SALT WATER MARSH:
Up to 6,000 Acres

Designations for Brine Pond Responses to Inflow Volumes

- Brine Pond Area w/ Inflows of 650,000 AFY
- Brine Pond Area w/ Inflows of 850,000 AFY
- Brine Pond Area w/ Inflows of 1,000,000 AFY





NORTH SEA ALTERNATIVE CONCEPT EXAMPLE

BARRIER:
8 Miles north of Mid-Sea Barrier

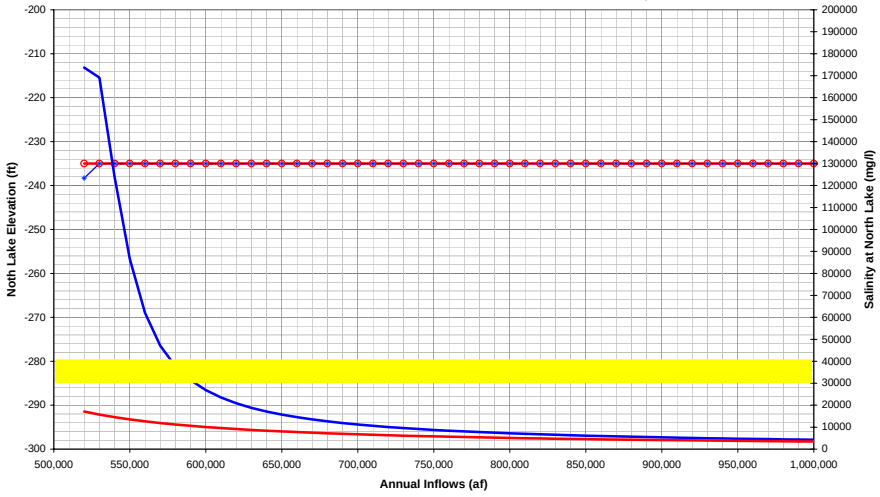
FRESHWATER MARSH:
None in this example

SALT WATER MARSH:
Up to 6,000 Acres

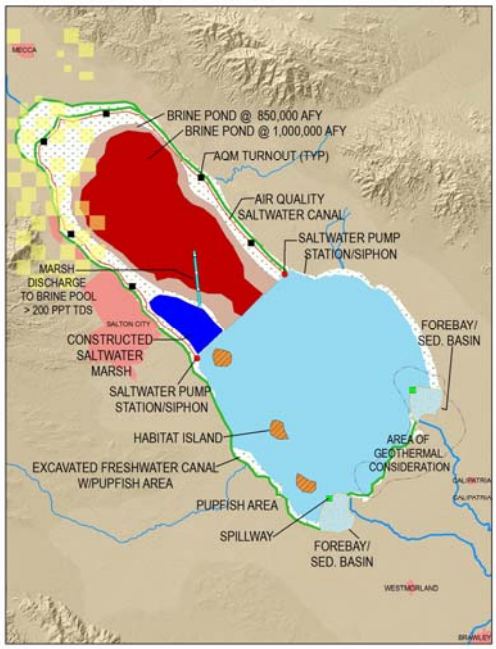
North Sea Configuration at Location 8 Miles North of 0
Steady State Inflows and Sea Elevation Goal of -235

Red = Water balance includes WQ treatment & constructed freshwater habitat (includes AQM and Salt Water Marsh

Blue = Water balance does not include WQ treatment & constructed freshwater habitat (includes AQM and Salt Water Mars



South Sea Alternatives



SOUTH SEA ALTERNATIVE CONCEPT EXAMPLE

MID-SEA BARRIER:
Shortest Distance across Salton Sea

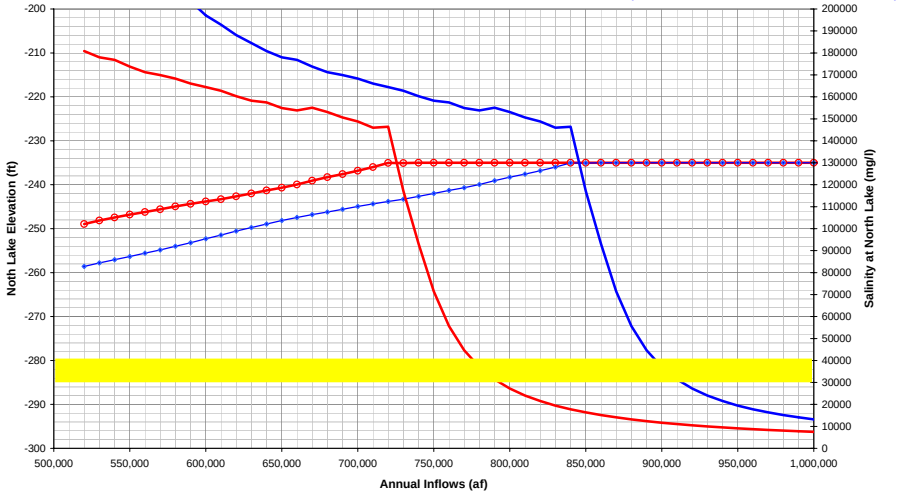
FRESHWATER MARSH:
Not Included in this Example

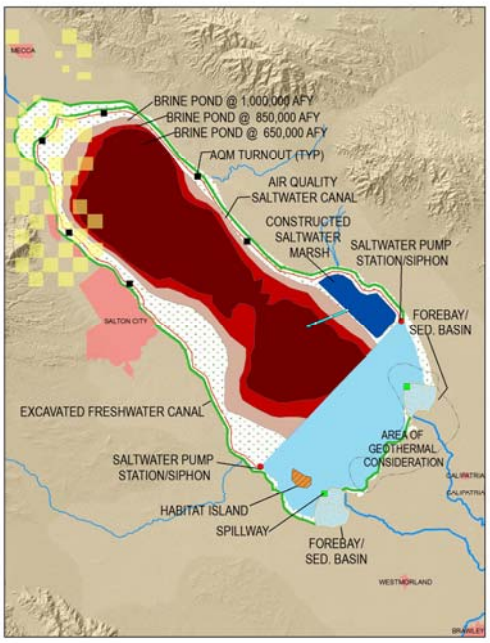
SALT WATER MARSH:
Up to 6,000 Acres

South Sea Configuration at Location 0
Steady State Inflows and Sea Elevation Goal of -235

Red = Water balance includes WQ treatment & constructed freshwater habitat (includes AQM and Salt Water Marsh)

Blue = Water balance does not include WQ treatment & constructed freshwater habitat (includes AQM and Salt Water Marsh)



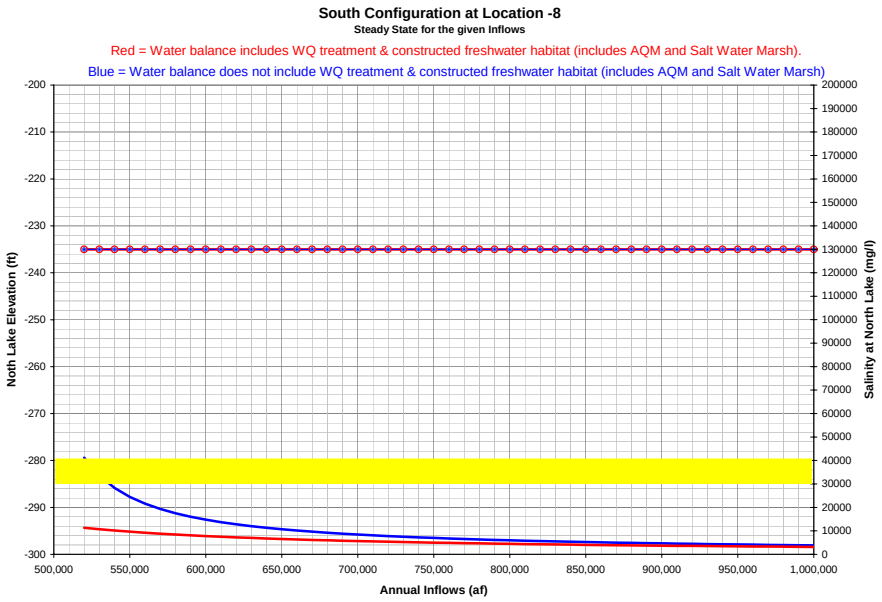


SOUTH SEA ALTERNATIVE CONCEPT EXAMPLE

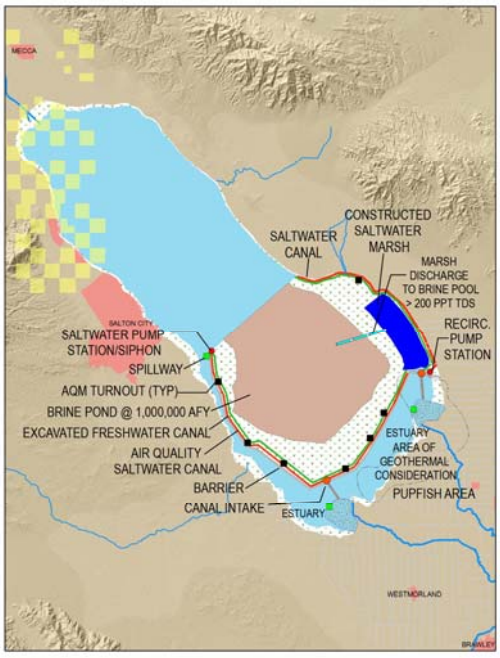
BARRIER:
8 Miles south of Mid-Sea Barrier

FRESHWATER MARSH:
Not Included in this Example

SALT WATER MARSH:
Up to 6,000 Acres



North Sea Combined Alternatives



NORTH SEA COMBINED ALTERNATIVE CONCEPT EXAMPLE

MID-SEA BARRIER:
Shortest Distance across Salton Sea

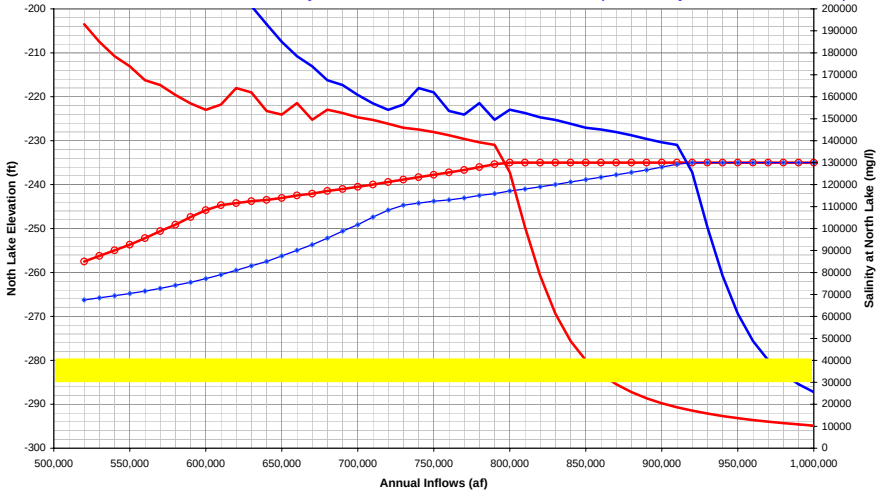
FRESHWATER MARSH:
Not Included in this Example

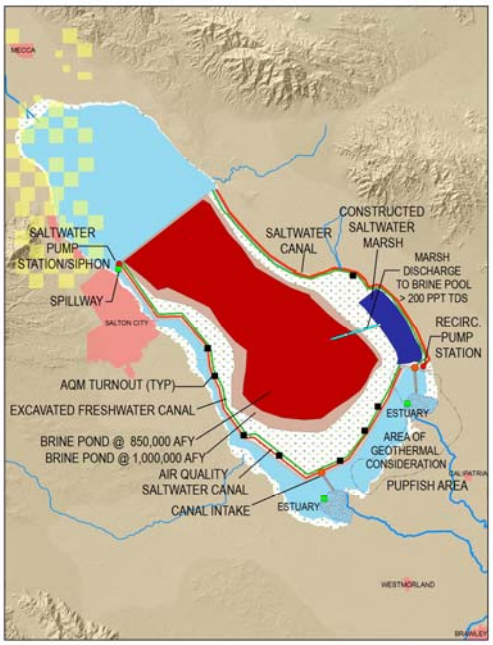
SALT WATER MARSH:
Up to 6,000 Acres

Combined Configuration at Location 0
Steady State Inflows and Sea Elevation Goal of -235

Red = Water balance includes WQ treatment & constructed freshwater habitat (includes AQM and Salt Water Marsh)

Blue = Water balance does not include WQ treatment & constructed freshwater habitat (includes AQM and Salt Water Marsh)



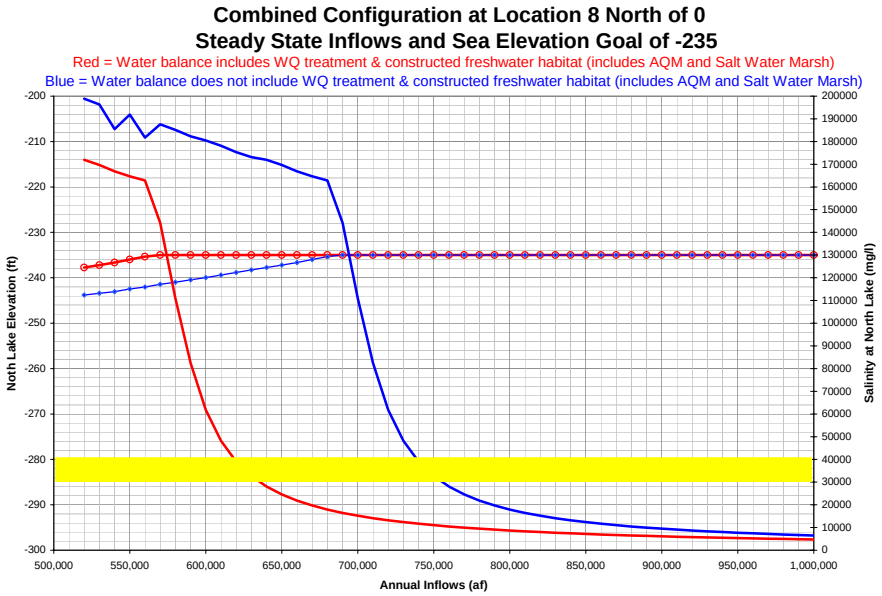


NORTH SEA COMBINED ALTERNATIVE CONCEPT EXAMPLE

BARRIER:
8 Miles north of Mid-Sea Barrier

FRESHWATER MARSH:
Not Included in this Example

SALT WATER MARSH:
Up to 6,000 Acres



Next Steps

- **Complete details of remaining configurations**
  - South Sea Combined Alternative
  - Cascade Alternative
  - Import/Export to Gulf of California Alternative
  - Evolving Sea Alternative
- **Revise alternatives to incorporate information from Habitat and Inflows Workgroups**
- **Prepare Cost Estimates for alternatives**
- **Prepare Report for Infrastructure Alternatives**